

20. ARACHNOIDEA.

3. Acari

by

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With 2 plates.

Amongst the collections brought home by Prof. SJÖSTEDT from the German East-Africa there are some acari which he has kindly handed over to me to work out.

It is scarcely necessary to point out that the collection, although it contains 18 species, 12 of which are new to science, is in no way exhaustive and only represents a small part of the acari which occur in that country.

Only two subfamilies of the *Trombidiidæ*, the more conspicuous, scarlet-coloured *Trombidiinæ* and *Erythraeinæ* seem to be well represented, numbering not less than 12 i. e. $\frac{2}{3}$ of the whole collection.

Besides these there are a few stray specimens of *Laelaptinæ* and nymphæ migratoriæ of *Uropodinæ*, found on rats and beetles.

Fam. **Trombidiidæ.**

Subfam. *Erythraeinæ.*

Rhyncholophus DUG.

Rhyncholophus siculiformis TRGDH.¹

Meru-mountain, one specimen; *Kilimandjaro*, one specimen: Kiboscho 19. II. 1906.

The species was described by the author in 1904 from the desert at Heluân, Cairo.

¹ Results of the Swedish Zoological Exp. to Egypt and the white Nile 1901. No. 20. Part I, p. 64—65.

Rhyncholophus meruensis n. sp.

(Pl. 2, figs. 3, 21 & 28.)

Length 2,¹⁶ mm., Breadth 1,²⁶ mm.The shape is the same as that of *R. siculus* CAN.

The dorsal side is thickly clothed with sharp bristles (Pl. 2, fig. 28.), which are provided with or rather divided in smaller, pointed bristles in the proximal half; these are arranged in five rows of 3—4 each and increase in length towards the top.

One pair of sessil, rather large eyes. The crista metopica (Pl. 2, fig. 21.) is long and straight and measures 0,⁴⁵ mm. in length; it widens anteriorly to a spoon-shaped, finely punctured pseudostigmatic area, the distal $\frac{2}{3}$ of which project as a free blade, which covers the base of the rostrum. The area is provided with numerous, long hairs, similar to, but much more slender than those of the dorsal side. The setiform pseudostigmatic organs are inserted far backwards.

Posteriorly the crista widens to the smaller, triangular and rounded posterior pseudostigmatic area; the posterior pseudostigmatic organs of the same shape as the anterior ones but a little longer.

The rostrum is long, provided with numerous long hairs, and widens at the top to a ventral, semicircular, fringed blade. The palps (Pl. 2, fig. 4). The coxæ are large, fused in the middle and contiguous to the coxæ of the first pair of legs. The first free joint is very small and triangular; the second joint is twice as long as it is broad and longer than the 3rd+4th; the 3rd joint is narrow; the 4th joint is very short, with a very short and curved terminal claw, the ventral edge of which is provided with 2 small teeth at the base. The 5th joint nearly cylindrical, with obliquely squared top, longer than the 4th joint incl. of the claw. The palps are provided with numerous feathered hairs; the 2nd joint has ventrally behind the middle one long, bare hair and dorsally in the middle one long, feathered hair. The 3rd joint has one longer hair dorsally in the middle. The 5th joint is provided with numerous small hairs and a ventral ring of 8 longer radiating hairs, of which 4 point inwards, 1 backwards and 3 outwards.

Ventral side. Coxæ I & II, III & IV fused together; coxæ I and III of the same length, shorter than coxæ II and IV; coxæ IV are the longest. All tarsi are thick; tarsi I twice as long as the others. All legs provided with two kind of hairs; the usual ones which are very closely set, and on the dorsal side others, which are longer and more or less perpendicular. The genital aperture very long, more than three times as long as the anal aperture.

Meru-mountain, 3000—3500 M., 10 specimens.

Erythræus LATR.**Erythræus mucronatus** n. sp.

(Pl. 2, figs. 5 & 12.)

Size and shape like that of *E. regalis* C. L. KOCH. Texture. The cuticle of rostrum and the legs finely punctured. The dorsal side provided with fine

slender hairs, which are so very finely hairy that great magnification is necessary to notice the hairs; amongst the hairs there are interspersed stouter and blunter, brown-coloured bristles. Two pairs of sessile eyes of equal size, and enclosed within the same chitinous ring. The crista metopica is long and straight (Pl. 2, fig. 12.) and projects in a narrow bar behind the posterior pseudostigmatic area. The anterior pseudostigmatic area is large, oval and highly raised; it continues forward in a narrow, thinwalled, fingershaped projection which bears one terminal and one median bristle. The area itself is provided with 10 long bristles and a pair of long, setiform pseudostigmatic organs. On the crista, at equal intervals between the areas, two pairs of large bristles are inserted. The posterior area is nearly triangular, with rounded corners and highly raised surface; the pseudostigmatic organs are long, setiform and bare and attain the length of the distance between the areas. The rostrum is short, conical and pointed; the ventral side provided with nearly bare bristles; at the top there is a semicircular, dense row of hyalin, lanceolate, flat and curved bristles, the edges of which are sawshaped. The palps are long and slender (Pl. 2, fig. 5); the ratio length of the 2nd, 3rd and 5th joints is 15:8:5 and the height of the 2nd and 3rd is 7:4. The 5th joint is oval and rounded, with narrow base. The claw is shorter than the 5th joint and provided with a basal tooth. The 2nd joint is richly provided with long, perpendicular hairs on the external side ventrally; its dorsal side with large bristles anteriorly. The 3rd joint has 7 long, curved bristles on the dorsal side.

The legs. The length of their joints will be seen from the following table.

Pair of legs.	Joints of the legs					Height	Entire length.
	2	3	4	5	6	6	
1	0,45	0,88	1,08	0,99	0,42	0,14	3,82
2	0,18	0,42	0,54	0,56	0,28	0,11	1,98
3	0,32	0,54	0,63	0,72	0,23	0,1	2,44
4	0,4	0,88	1,03	1,08	0,27	0,1	3,66

Legs I are thicker than the others.

Meru, 2 specimens. *Kilimandjaro*: Kibonoto 1300–1600 M., 1 specimen.

Erythraeus Dugèsi Nic.

Kilimandjaro: Kiboscho, on the mountain-lawns near the upper limit of the vegetation, 3400–4000 M. 5 specimens.

The species is recorded from Alger and Egypt.

Erythraeus areolatus n. sp.

(Pl. 2, fig. 20.)

Larva.

Length varying from 1 to 1,4 mm.; width from 0,6 to 0,75 mm.

Shape long oval, anteriorly a little broader in the younger specimens; in the

older ones the posterior and anterior margin of the same shape, the greatest width being in the middle. Texture finely transversally wrinkled; the shield, the rostrum and the coxæ finely punctured.

The dorsal side bears small, blunt, hairy and slightly curved hairs. The shield (Pl. 2, fig. 20) is almost pentagonal; the anterior side slightly concave, the anterolateral corners obliquely truncate, the lateral angles broadly rounded, the posterior sides convex, forming together a nearly semicircular line, with an incision at the posterior end, on each side of the pseudostigmatic organs; the posterior angle broad and rounded, with a median incision. The shield is, as above mentioned, finely punctured, and exhibits furthermore two median longitudinal rows of rounded, depressed areas, 7—8 in each row.

Pseudostigmatic organs. Two pairs of them; one pair, situated close together in deep pores far forward, half as far away from the anterior as from the posterior side, is setiform and of even length throughout; the other pair is placed in the posterior corner, in the two round lobes formed by the three incisions; they are twice as long as the anterior pair and gradually tapering in the distal half. The shield is provided with the usual 3 pairs of hairy, blunt bristles, placed in the anterior half at the margin and increasing slightly in length forwards.

Eyes. One pair of submarginal eyes, on a level with coxæ II. Pseudoepitulum of the usual shape. The claw of the 4th joint of the palps is stout and deeply bifurcate; the 2 dorsal hairs of the maxillæ situated far forward; 5th joint low, but anteriorly projecting in a small conical appendage. Sense organ as in *Erythræus kibonotensis* TGDH.

Ventral side. The coxal shields finely punctured; coxa I with one long hair; coxa II with two, one anteriorly and distally, directed outwards, the other in the middle and directed backwards; coxa III with two hairs, one as the first hair of coxa II, the other near the anterior side, proximally.

The legs do not exhibit anything peculiar.

Kilimandjaro: Kibonoto. 13—1600 M. 14 Nov. 1905. On a grasshopper, 10 specimens.

Erythræus kibonotensis n. sp.

(Pl. 2, fig. 19.)

Larva.

Length from 1 mm. excl. rostrum. Greatest width from 0.6 mm.

Shape oval in the younger specimens, more ovoid in the older ones.

Texture. The shield, the rostrum with the palps and the coxæ finely porate. The rest of the body is finely transversally striated or wrinkled.

Dorsal side.

The shield (Pl. 2, fig. 19) is nearly pentagonal, with the top backwards. The anterior side slightly concave, the other sides convex; all angles rounded; the posterior one with a small median incision. The two pairs of pseudostigmatic organs are situated, one a little in front of the centre, the other close to the posterior corner.

The pseudostigmatic organs are long and setiform, the posterior ones a little longer than the others, measuring 0,69 mm.

Eyes. One pair of single, rather large eyes close to the sides of the body, on a level with the anterior margin of coxæ II.

Hairs. Three pairs of thick, blunt, hairy hairs, tapering gradually from a broad basis towards the top. They are placed as follows: one pair near the antero-lateral corners, one pair in the lateral corners and the third pair half way between the others, but a little more inwards.

The dorsal side of the body is provided with about 35 pairs of similar, although somewhat more slender and curved hairs.

The pseudocapitulum (Pl. 2, fig. 19) is strongly chitinized and of a brownish yellow colour.

The maxillary palps 5-jointed, inserted ventrally. First joint very small, flat; the second large, and broad, curved forward at a nearly right angle and at the same time bent upwards, so that its distal half becomes nearly vertical and the exterior (dorsal) side raised to the level of the upper side of the mandibles; 3rd and 4th joints narrow and straight, only half as broad as and both together as long as the second joint. The 4th joint slightly longer than the 3rd; it terminates in a double claw nearly as long as the joint and curved slightly only at the top.

The 5th joint is discernible only as a low pad on the ventral and inner side of the 4th joint.

Hairs. One blunt, stout and hairy bristle, curved slightly forwards at the basis, is inserted on the external, upper edge of the second joint, in the middle; it extends forwards as far as to the anterior margin of the 3rd joint. On the 3rd joint there is, on the inner side far backward, a fine, curved pectinate hair. On the 4th joint there are two similar hairs, one on the outer side, the other on the ventral side in the middle and directed backwards. The 5th joint bears 7 fine, bare hairs, one of which is directed straight inwards and downwards, two outwards and forwards, and 4 inwards and forwards.

Sense organ. Close to the posterior margin of the 5th joint there is a small cylindrical, thin-walled appendage, striated transversally.

The hypostome. The two proximal thirds of the coxæ fused together to a flat shield, with a longitudinal shallow groove in the middle. The posterior margin is slightly concave, the anterior one nearly semicircular and distinctly set off from the rest of the maxillæ. A little in front of the middle and submarginally the palpi are inserted in deep foveolæ. Half-way between the palpi and the front margin there is a pair of fine, pectinate hairs. The distal thirds are of the typical shape, surrounding the claws of the mandibles with a large, extremely thin, hyalin plate, open at the front. On the ventral side of this sucker-plate there is a dense ring of fine, radiating and rod-like appendages.

Mandibles of the typical shape, broad, flattened dorsoventrally, the dorsal side sloping down towards the median, parallel sides, which are pressed closely together.

In front of the mandibles and surrounding their tips the upwardly eurved tips of the maxillæ form a broad, horseshoe-shaped ridge, provided with a pair of straight feathered hairs.

Ventral side.

The coxal shields more or less triangular, with rounded median margin. Coxæ I shorter and broader than the others, with one hair of the same shape as the dorsal ones, eurved outwards and backwards and inserted near the anterior margin. Coxæ II with 2 similar hairs, one of which is placed at the anterior margin, distally, while the other is inserted ventrally, a little outside and behind the middle. Coxæ III with two hairs, one at the antero-lateral angle, the other near the anterior margin, proximally. Between coxæ I, on a level with their posterior margin, there is one pair, between coxæ II one pair, on a transverse line in front of coxæ III two pairs of hairs and between coxæ III 3 hairs; further back on the belly about 20 pairs of hairs. Anus small, oval, in the centre of the belly. The legs. All the legs are slender, with finely porate eutiele. Trochanter small; femur divided into basifemur and telofemur, which are of subequal length in the resp. legs. The genu is slightly shorter than the basi- and telofemur together. Genu and tibia I of equal length, genua II and III slightly shorter than the resp. tibia. The tarsi from broad base narrowing towards the top and eurved slightly downwards. The elaws of the usual shape.

Kilimandjaro: Kibonoto. 6. XI. 1905. Numerous specimens on the dorsum of an *Aeridiid*.

Subfam. Trombidiinæ.

Allothrombium BERL.

Allothrombium pergrande BERL.

Usambara: Mombo, VI, 6 specimens.

Kilimandjaro: Kiboseho 3400—4000 M. 19. II. 1906 2 specimens. The species is recorded from Italy, Egypt and Sudan.

Trombidium FABR.

Trombidium bipectinatum TGDH.

Meru-mountain. 3800 M., one specimen.

The species is up to the present time only recorded from Cameroon.

Trombidium holosericeum (L) FABR.

Kilimandjaro: Kiboseho. 19. II. 1906, 12 specimens.

Trombidium tinctorium (L.)

(Pl. 2, figs. 3, 23 and 25.)

Kilimandjaro: Kibonoto, 1300—1600 M., 3 specimens; Kiboseho, in the upper part of the rain-forest, 2950 M., 8 specimens; Kilimandjaro, III 1906, 4 specimens.

— *Meru*-mount., in the rain-forest, 3000—3500 M., 21. XII. 05, 42 specimens; *Meru*-lowlands, in the acacia forests at the river Ngare na nyuki, XI, 1905 14 specimens.
— *Usambara*: Mombo, VI 1906, 2 specimens.

***Trombidium simile* n. sp.**

(Pl. 2, figs. 2, 8—11 and 14—16.)

Length 2,07 mm. Width 1,45 mm.

The shape is the same as that of *T. sanguineum*, with high broad shoulders. The colour is a most beautiful orange-red.

The dorsal side is densely clothed by hairs of a most peculiar shape, inserted in very large cup-shaped pores. As a matter of fact the pores occupy a much greater space of the surface than what the interspaces do. The hairs are chiefly of two kind, but there are numerous forms intermediate between the two. The larger hairs (Pl. 2, fig. 15) are two-jointed; the basal joint is large and broad, thin-walled and excavated at the top; the distal edge is often provided with small teeth. At the top of the basal joint, but more or less to one side of it, the terminal joint is articulated. It bears on a slender, bare and curved peduncle a nearly globular head clothed with fine hairs, arranged in about 20 longitudinal rows, the whole structure resembling very much a shaving-brush. The shorter hairs (Pl. 2, figs. 14 & 16) have a very short and wide basis and globular, pear-or cucumber-shaped heads which bear very fine and short hairs, arranged in longitudinal rows. Two pairs of sessile eyes (Pl. 2, fig. 9) enclosed within the same, chitinous and finely punctured ring; the anterior pair is not half as large as the posterior one. The crista metopica (Pl. 2, fig. 10) has a very simple structure. It is straight and narrow and widens only at the hind end to a subtriangular pseudostigmatic area, which has a pair of short, setiform pseudostigmatic organs.

The palps (Pl. 2, fig. 2) are rather short and of the same general shape as those of *T. bipectinatum* TRÄG. The 4th joint has a dense interior (median), row or comb of strong, slightly curved and pointed bristles and is provided exteriorly, near the base, with a long straight, pin-shaped bristle, which projects forwards to a level with the base of the terminal claw. The terminal claw of the 4th joint is short, rather narrow and blunt; at its base there is a smaller d:0 of similar shape. The 5th joint is narrow, widens slightly towards the distal third; it exceeds the 4th joint by $\frac{1}{5}$ of its own length.

The mandibles (Pl. 2, fig. 8); the lower jaw with very broad base and strongly curved; the upper jaw is a thin, vertical, triangular blade, with straight dorsal and rounded ventral edge. The legs (Pl. 2, fig. 11). The tarsus of the first pair of legs is long and thickened.

Meru-mountain, in the rain-forest, 3,000—3,500 M., 8 specimens.

***Trombidium mernense* n. sp.**

(Pl. 2, fig. 18.)

Larva. Length 0,9 mm. Breadth 0,72 mm.

Shape, broad oval. Texture finely wrinkled; both the dorsal shields, the maxillæ, the maxillary palps and the legs more or less densely punctured.

The dorsal side has two shields anteriorly and bears 10 pairs of rather large hairs, arranged symmetrically. The posterior shield is semicircular, with straight anterior and rounded posterior side; it is provided with one pair of hairs behind the middle. The anterior shield (Pl. 2, fig. 18) is large and square; the posterior margin is slightly convex, with a shallow excavation near the postero-lateral corners; the sides are concave in the proximal half of the shield, which widens anteriorly and ends with broad, nearly semicircular and slightly wavy anterior edge. The distal third projects as a free, thin blade, separated from the rest of the shield by irregular, anteriorly convex lines, and is not punctured. The shield curves forwards and downwards and covers nearly entirely the mouthparts; it exhibits a pair of subcuticular nearly transversal ridges a little behind the level of the anterior margin of the body. There are 3 pairs of bristles; one median, anterior pair of bare, pointed bristles, directed straight forward and situated immediately in front of the punctured portion; the other two pairs, of which the posterior one is the longest, are lateral, more blunt and feathered and inserted, one at the postero-lateral angles, the other submarginally and halfway between the posterior margin of the shield and the anterior margin of the body.

Between the lateral bristles, but a little more inwards, the long, setiform pseudostigmatic organs are situated. Two pairs of eyes, situated close together on a level with the middle of the concave portion of the lateral edge of the anterior shield. The pseudocapitulum is, as above stated, nearly hidden beneath the anterior shield. The maxillary palps are short, 5-jointed. The first joint very short; the 2nd, 3rd and 4th joints gradually decreasing in length and width; the 2nd joint with a short pectinate hair dorsally and exteriorly; the 3rd joint with one similar more interiorly; the 4th joint externally with a transverse row of 3 bare bristles. The 5th joint very small, with 4—5 fine, radiating hairs. The claws of the 5th joint are curved strongly inwards and downwards. The hypostome. The coxæ are fused to form a ventrally finely punctured plate; the distal $\frac{1}{3}$ does not widen at the tip like a sucker-plate, but forms a thin semitube, open at the upper side and with hyalin edges, which surround the mandibles. The anterior edge of the tube is divided into one narrow, median, ventral slip and two pairs of nearly vertical, rounded lobes, the ventral one of which is twice as broad as the dorsal one. The mandibles of the usual shape, not punctured, with strong, pointed claws of equal size.

Ventral side.

Coxæ I and II are fused together; coxæ I anteriorly and distally with one long feathered bristle, directed backwards; coxa II with one similar.

The legs are short and finely punctured, femur I indistinctly divided into basi- and telofemur; 3 claws, of which the median one is long and slender.

Meru-mountain, in the rain-forest, 3,000—3,500 M., S. X., 1 specimen.

Fam. **Parasitidae.**Subfam. *Uropodinae.***Uropoda** LATR.**Uropoda plana** n. sp.

(Pl. 2, fig. 6. Pl. 3, figs. 8, 11, 14—16, 21, 22 & 28.)

Deutonympha.

Average length 0,92 mm. Greatest width 0,76 mm. Colour straw-yellow. Texture finely punctured. The shape of the body is broad oval, anteriorly falling off a little more than posteriorly, where it is nearly semicircular.

The dorsal side is protected by a single shield, which covers the whole surface. The dorsal shield bears at the front margin the so-called vertex, which is very narrow and shaped like that of *U. patavina* CAN. The vertex (Pl. 3, fig. 16) is completely fused with the dorsal shield on the dorsal side. Its anterior edge has a median, rounded, rather deep incision and is slightly excavated on each side of the incision: outside the excavations the edge thickens gradually to a ridge, with rough, granulated surface. The dorsal surface of the vertex exhibits laterally 5—6 pairs of narrow, radiating ridges and is very finely punctured. There is only one pair of hairs; they are large, but weak, inserted in deep pores on both sides of the median incision, and curved outwards and obliquely backwards. On the ventral side the posterior limit of the vertex is discernible as a transverse line.

The dorsal shield (Pl. 3, fig. 21) bears hairs of two different kinds. Round the margin, but inserted on the ventral side of it, is a closely set row of weak, pointed and flat hairs, which curve upwards round the margin and afterwards centripetally as nearly to rest on the dorsal shield (Pl. 3, fig. 28). There are 56—58 pairs of them. The other hairs are arranged chiefly in three nearly concentric rings.

In the outer ring there are 15 pairs of hairs; the hairs which lay close to the surface are directed outwards and exactly of the length to reach the margin. At the anterior side of each hair, except of the anterior one, there is a pore, which communicates through a narrow tube with a spherical gland measuring 0,09 mm. in diameter. The median ring consist of 12 pairs of hairs, somewhat smaller than those of the outer ring and directed centripetally upwards. The pores in which they are inserted are connected, one with another by irregular depressed areas of the cuticle, which thus form an irregular oval and wavy ring, a little nearer to the margin than to the centre of the shield. The ring is open at the back and in the front, where there are three pairs of hairs in the space between the outer and the median row. The inner ring consists of 7 pairs of hairs, the pores of which are flanked by markings of the cuticle, similar to those of the median ring, and besides exhibit a pore each,

like those of the outer ring; the pores are however situated behind the hairs in the anterior half and in front of them in the posterior half.

Finally there are in the centre of the shield 6 pairs of small hairs arranged in two longitudinal rows of two and two together.

Ventral side (Pl. 3, fig. 11.)

Tritosternum (Pl. 3, fig. 8) of a peculiar shape. The basal part of the trunk is three times as broad as the rest and projects in two short, lateral teeth. The trunk, which is two-jointed, the terminal joint being only $\frac{1}{5}$ of the basal one, narrows slightly in the middle and widens again in the distal third. There is only one median flattened slip, inserted in a deep, cup-shaped pore at the top of the trunk. The slip, the proximal half of which is twice as broad as the distal one, branches off into two minute lateral slips in the middle.

Jugular shields (Pl. 3, fig. 15).

As far as I am aware of, no jugular shields have been found hitherto in the *Uropodinæ*. This depends on the fact that they, being entirely concealed beneath the highly developed coxæ of the first pair of legs, have been overlooked by the authors.

If we dissect carefully the rostrum and the first pair of legs, we find, on each side of the tritosternum and covered completely, as well as the tritosternum, by the coxæ I, a hyalin, chitinous plate, which is attached only with its hind edge to the soft portion of the cuticle between the coxæ and the rostrum. The plates resemble indeed in shape very much the mandibles of an insect, for instance those of a termite worker. They are flat and nearly triangular in outline, with broad basis, and get gradually thinner towards the median edge. The basal and lateral portion of the plate is softer and thicker. The lateral edge is rounded; the median edge is very thin and sharp and bears on the ventral side 4—5 small, perpendicular tubercles. The edge itself has two large teeth; the anterior one has 2—3 very small teeth at the tip: the anterior edge of the posterior one is straight, with small teeth placed at regular intervals; behind this there is a rounded lobe, behind which the edge is slightly concave. To judge from the position of these plates, there cannot, in spite of their peculiar shape, be any doubt about their identity with the jugular shields of other *Parasitidæ*¹. Otherwise they are structures not met with, except in the *Uropodinæ*.

Their shape suggests that they serve the purpose of effecting, together with the coxæ and the trochanter of the first pair of legs, a thorough closing as to protect the rostrum.

The sternal shield (Pl. 3, fig. 11) covers the whole space between the coxæ II, III and IV and the anterior half of the belly, and is finely punctured.

The anterior edge is slightly concave, with a blunt median projection; the antero-lateral corners project as far as to the middle of the anterior margin of coxæ

¹ This question I intend to investigate further, when describing the collection of *Uropodinæ* which I have brought home from Natal and Zululand.

II. The shield narrows between coxæ II and attains its greatest width between coxæ II and III and at the postero-lateral angles. The posterior margin is straight. It is provided with 6 pairs of weak, slender hairs, of which one pair is situated on a level with the middle of coxa II, two pairs, one closely behind the other, between coxæ II and III, one pair on a level with the hind margin of coxa III, one on a level with the front margin of coxæ IV and the last pair half way between coxa IV and the posterior margin. The ventral shield is large, triangular; the broad, square anterior margin is contiguous to the posterior margin of the sterniti-ventral shield. The antero-lateral angles and the sides are rounded. The hind margin is deeply excavated and surrounds the anterior half of the basis of the great peduncle, which attains the length of half the body and often is seen to branch off into two. The anal shield bears 6 pairs of slender hairs, two of which are inserted close to the front margin, one near the antero-lateral angle, and two pairs, which are smaller and stouter, on both sides of and in front of the peduncle.

When the peduncle is cut off, the anal shield becomes visible. It is broad, oval, twice as broad as it is long, and flanked by two pairs of short, pointed hairs.

The endopodal shields (scuti endopodici BERLESE) are distinctly separated from the sternal shield and project half-way between the coxæ with square tips, which meet the pleural ridges of the parapodal shields. They coalesce behind coxæ IV with the large metapodal shields, the median edge of which is contiguous to the lateral edge of the sternal shield, and the posterior edge with the anterior one of the ventral shield.

The metapodal shields are distinctly separated from the parapodal shields by a line, running obliquely backwards from the middle of coxa IV, thus parallel with the lateral edges of the sternal shield. The shields do not reach quite as far as to the ventral shield, the antero-lateral angles of which thus are contiguous with the hind angles of the parapodal shields. The metapodal shields have a deep foveola to receive the tips of tarsi IV. The parapodal shields are of the typical shape and do not exhibit anything peculiar. The stigmata are situated in the bottom of the foveolæ pedales III. The peritremata run obliquely forwards and outwards, ascending the hind slope of the processi metapleuri (BERLESE), run along the exterior margin of foveola pedalis II and continue straight forwards to the margin of the body, exactly to where the limit is between the vertex and the dorsal shield.

The rostrum is protected in front by a narrow, halfmoon-shaped plate, the tectum, (Pl. 3, fig. 14) the front edge of which is provided with numerous teeth and has a median, broad and triangular projection.

The epistoma is of the usual, long lancet shape; the edges of the distal half are fringed; the tip ends to all appearance in a bundle of very minute flips. The styli are long, blunt, more than half as long as the epistoma.

The mandibles. The chela is small and narrow and resembles very much that of *Uropoda obovata* C. & B. [Acari italiani Tav. 155]. The upper jaw is longer and stouter than the lower one and projects in a thin, vertical and rounded blade in front of the blunt terminal tooth, and separated from it by a small incision. The

lower jaw has a straight ventral edge, curved upwards at a right angle at the top. The maxillæ. The coxæ, which are fused together to constitute the ventral side of the rostrum, are long and narrow and the part of them in front of the articulation of the palps is more than half as long as the rest. They bear the usual 4 pairs of hairs, placed in two rows, converging slightly forwards and with the intervals slightly decreasing forwards. They are of different shape, the two posterior pairs being stouter, hairy and almost perpendicular. The third pair (counted from the posterior one) is longer and more pointed than the other two and not hairy. The terminal hair, which is inserted close to the inner side of the maxillary lobes, is three times as long as the third pair, fine, slender and slightly curved. The maxillary lobes are strongly chitinated and of the usual shape. The maxillary plates are narrow, lanceolate, thin, hyalin slips, without fringes, and project only a little in front of the maxillary lobes. The lingua or hypopharynx is long, with fringes in its distal third.

The maxillary palps (Pl. 3, fig. 22) are short and curved downwards, with 5 free joints. The first joint has, on the ventral side near the anterior angle, a cylindrical, narrow projection¹, which ends in a sharp point and has near the tip a straight, sharply pointed bristle, which points obliquely downwards, thus giving to it the appearance of being bifurcate; on the outer side, ventrally, there is one stout, perpendicular, hairy bristle. The second joint has 4 pairs of hairs, 2 of which are placed externally, one dorsally and one internally. The third joint has two hairs on the dorsal and one on the inner side. The 4th and 5th joints form together a short, conical structure; the demarcation line between them is distinctly discernible only at the inner side, where the 5th joint is longer than it is on the outer side. The joints are provided with numerous long, pointed, bare hairs of which 3 dorsal ones, inserted on the 4th joint, and 2 ventral ones, inserted on the 5th joint, are 3—4 times as long as the others. The 3 dorsal hairs are bent like a knee as to become parallel or slightly converging. The top of the 5th joint bears a dense bundle of fine, pointed hairs, curved slightly downwards. The comparatively very great increasing in length of these sense hairs is doubtless a compensation to the palps being concealed underneath the coxa and trochanter I, in order to enable the creatures to make use of the palps even when covered up.

The legs. Legs I (Pl. 2, fig. 6) without ambulacres, of the typical peculiar shape. Coxa and trochanter broad and flat, forming together a broad, finely punctured shield; coxa with sharp, even, knife-shaped inner (median) edge; the outer edge also flat, but divided into two rounded lobes, of which the anterior one is only half as long as the posterior one. The anterior edge projects as to cover the basis of the trochanter; the exterior half of the edge with fine teeth. The coxa bears two short, stout, feather-shaped bristles near the median edge. Trochanter on ventral view nearly quadrangular, with rounded anterior angles. The median edge with two strong, flat tubercles with a sharply pointed hair between them, on the ventral side. The anterior edge projects as a sharp, horizontal blade, as does

¹ I have not been able to ascertain, whether this projection articulates with the joint or not, but I believe the former to be the case.

also, and to a still greater extent, the antero-lateral angle, the free blade of which is kidney-shaped in outline and covers as well a part of the anterior blade as the whole basifemur. On the ventral median side, on a level with the hair, there is a short, low tubercle. There are, beside the one mentioned above, two hairs, one perpendicular, in the middle and one near the front margin.

Femur clavated, with distinctly demarcated, short basifemur. The anterior edge projects into a sharp blade which is divided into three lobes by two sharp incisions, in the bottom of which two hairs are inserted. The posterior lobe is twice as high as the others and exhibits a narrow ridge which runs across the basis of the femur. Near the basis, opposite to and nearly touching the antero-lateral blade of the trochanter, there is a small flat tubercle. The exterior edge of the femur is strongly curved and provided with 4 short, feather-shaped and curved bristles; on the dorsal side there are two stout, pointed and perpendicular bristles, and on the ventral side there is one small, inconspicuous hair in the centre.

Genu and tibia very short, of equal size and shape, with one hair each in the middle, ventrally, and two on the outer side.

Tarsus very long, cylindrical, with the exterior side slightly excavated, provided with small scattered hairs, except on the exterior side, at the top, where there is a dense bundle of about 15 long hairs, pointing obliquely outwards. The top has a low, cylindrical projection, where a very long straight hair is inserted.

Legs II—IV do not exhibit anything peculiar, the femora being provided with the usual blade-shaped edges, which are low and triangular with rounded margin.

Kilimandjaro. Numerous specimens.

Urodinychus BERL.

Urodinychus testudo n. sp.

(Pl. 3, figs. 5, 10, 17—19, 23, 29 & 30.)

Deutonympha.

Average length 0,33 mm., greatest width 0,24.

Colour yellowish-brown. Shape like that of *Uropoda tecta* KR.

The dorsal side (Pl. 3, fig. 19) is covered by a large central shield and a narrow marginal shield, which are fused together at the anterior end. The dorsal shield is polished and bears numerous small hairs arranged in rows, more or less parallel with the margin. The marginal shield bears on the dorsal side a row of about 34 pairs of hairs with interstices equal to their own length. The ventral side of the marginal shield is of the shape typical for the genus, i. e. divided into small square plates by transverse light-coloured lines; each plate with a hair in the centre, directed straight outwards and scarcely extending beyond the margin; there are about 25 plates.

Ventral side (Pl. 3, fig. 23.)

Tritosternum (Pl. 3, fig. 15). The trunk short and stout, somewhat constricted near the base; ventral side finely punctured; at the anterior end two short appendages; two very narrow pectinate slips, which are however not lateral, but one is ventral, the other dorsal; thus they are congruent and appear to be only a single slip.

The jugular shields (Pl. 3, fig. 18) are thin and hyalin, well chitinized only at the base, internally; the inner (median) edge is divided into 5 slender teeth, 3 of which are three times as long as the others and placed close together in the distal half; of the other two one is placed at the proximal corner, the other half way between the latter and the other teeth.

Sternal shield long, narrow. The anterior side slightly concave, with a small, sharp, median projection. The lateral edges are thin blades, covering the proximal part of the endopodal shields and slightly concave on a level with coxæ II and IV; the greatest width is on a level with coxæ III and at the acute posterior corners. The posterior margin is concave and contiguous to the anterior margin of the ventri-anal shield. The shield bears 6 pairs of small, submarginal hairs; one on a line with the anterior margin of coxæ II, one on a line with their posterior margin; 2 between coxæ III, one on a line between coxæ III and IV and one on a line with the hind margin of coxa IV. The shield is sculptured by small, circular, shallow, depressed spots.

The endopodal shields of the usual shape, fused with the metapodal shields. The ventri-anal shield broad, semilunar, with convex anterior margin; 6 pairs of small hairs. Anal aperture rather large, square-oval, pointed posteriorly, with two pairs of hairs. The stigmata are situated in the bottom of foveolæ pedales III, a little outside and in front of the centre. The peritrema ascends the anterior slope of the foveola in a curve outwards, winds twice inwards, once outwards, runs outwards along the anterior edge of the mesopleural ridge and doubles its top, bends inwards in a long even curve along the bottom of the foveola pedalis and beneath the free tip of the prop-leural ridge, and continues forward to a level with the anterior side of coxa I.

Epistoma (Pl. 3, fig. 10.) of the usual shape; the proximal half base narrows abruptly at the top to a narrow, finely fringed slip. The mandibles (Pl. 3, fig. 30). The chela slender, constricted at the base, narrowing anteriorly. Even the upper jaw seems to be movable by means of an interior, long, narrow and chitinous projection, to which a tendon is attached. Upper jaw broad, narrowing towards the tip, with broad inner edge, provided with 5 blunt teeth, alternating with the 4 teeth of the lower jaw. The hypostoma (Pl. 3, fig. 29). Only 3 pairs of rather stout, feathered hairs, placed in two longitudinal, parallel rows. The posterior pair is stouter and shorter and curved towards the middle; the median pair is twice as long as the others and finely pointed. The maxillary lobes are placed laterally, and are nearly vertical; they are weak, with narrow base, and almost parallel, only very slightly converging sides; the anterior side is deeply excavated in the middle, thus forming two horns of which the lateral one is largest. The maxillary plates narrow, lanceolate, without fringes; near the tip on the external side with a short slip. The maxillary palps

(Pl. 3, fig. 29): the ventral edge of the first joint is high and provided with two bristles of a peculiar shape: one is straight and tripartite at the top; the other is longer, curved downwards and inwards and ramose on the convex side. The 3rd joint has a small bristle internally, in the middle.

The legs. Coxa and trochanter I with scaly texture, of the usual shape, flat and broad. The inner (median) anterior angle of the trochanter projects as a thin, nearly triangular blade. The inner edge of femur I with a fine, pointed hair, inserted on a low tubercle, outside the tubercle a very thin, high and multidentate blade. Femora II—IV with the usual blades. Tarsus II externally in the middle with one stout, short thorn; basi- and telotarsi III and IV with one similar each.

Kilimandjaro: Kibonoto, 11. II. 1906. On a beetle, numerous specimens; Kibonoto 7. VIII. 1905. On a staphylinid (?), numerous specimens.

Subfam. Parasitinae.

Holostaspis KLT.

Holostaspis (Holostaspis) marginedentatus n. sp.

(Pl. 2, figs. 13 & 24. Pl. 3, figs. 2 & 6.)

Female. Length 1,2 mm. Breadth 0,8 mm.

Colour deep chestnut-brown. Texture, most beautifully marked with fine, corrugated, raised lines, forming polygonal areas, thus producing a net-like pattern. The cuticle in the areas is granulated. This texture is to be found both on the dorsal and the ventral shields and on the legs. Only the dorsal side of the rostrum is smooth; the proximal ventral part is finely punctured.

The dorsal shield covers nearly the whole dorsal side; only a very narrow strip of weak skin round the margin. The margin of the shield is not smooth, but granulated and provided with small blunt teeth at regular intervals, from the level of coxæ II backwards, and slightly increasing in size backwards; there are 14 pairs of them. The shield bears rather scarce hairs, those at the shoulders larger than the others. The hairs are rather long, stout, very slightly curved and of even width throughout, abruptly narrowing at the top; their proximal third is bare, the rest is closely clothed with fine hairs. The marginal strip bears 8 pairs of smaller, submarginal hairs at the sides and 4 marginal pairs in the posterior part.

Ventral side (Pl. 3, fig. 2.)

Tritosternum. The trunk from a broad base gradually narrowing towards the top, very weak and transparent. The slips not fused, with large fringes. Sternal shield broad, extends backwards to the posterior side of coxa III; its greatest width is between coxæ II and III. The anterior margin concave, the antero-lateral angles broad, projecting outwards beyond coxæ II and forwards outside along the foveolae pedales I to their front margin. The posterior edge is semicircularly excavated to make room for the genital shield; the posterior angles narrow, truncated at the top.

The sternal shield is fused with the endopodal shields to the middle of coxa III; but further backward it is distinctly demarcated from the endopodal shield III by a straight line which runs from the middle of coxa III to the posterior side of coxa IV, exactly on a level with the posterior margin of the genital shield, and where consequently the genital, metapodal and 3rd endopodal shields meet. The shield bears the usual 3 pairs of hairs at the usual places, but rather far from the margin. Contiguous to the square end of the postero-lateral angle of the sternal shield and bordering, inwards on the genital shield, outwards on the endopodal shield, is a small, triangular plate, the metasternal shield, provided with a large bristle. The genital shield large, semicircular, with straight posterior margin and slightly rounded lateral corners; one pair of hairs in the posterior corners. The ventri-anal shield is large and covers the whole belly, except for a very narrow marginal streak. It is broader than it is long, the length to the width being as 9 to 13. The anterior margin is contiguous to the posterior margin of the genital shield; the posterior half semicircular; lateral corners broad, rounded. The shield bears 8 pairs of hairs, of which 7 are similar to the dorsal ones; one pair is placed at the anterior margin, 2 are lateral, 4 are placed at the margin in the posterior half, one pair in the middle, one pair, short and bare, on a level with the anterior margin of the anal aperture, and one terminal hair behind the anus.

The anal aperture is twice as far away from the anterior as it is from the posterior margin, with raised, long and oval cribrum.

The metapodial shields are distinctly demarcated from the posterior endopodal shields, narrow and ring-shaped.

The stigmata on a line between coxæ III and IV; the peritreme curves first backwards and outwards in a loop which rises above the level, turns then inwards and runs close outside and along the foveola pedalis II and extends forward along the foveola pedalis I and becomes dorsal in front of it. In the portion of soft skin between the metapodal and ventri-anal shield there is a pair of small, rounded and finely punctured plates, the inguinal shields(?); they are the orifices of a large tubular gland, which is resistant even to hot caustic potash.

The epistoma (Pl. 2, fig. 13); the proximal third is broad, with concave edges, provided with fine scaree teeth; the lateral lobes long, directed straight forward and of even width in their proximal half; from thence they widen gradually to the top, which is very broad, square and with only slightly concave anterior margin; the exterior angles are broader than the interior (median) ones and divided into 2—3 fine slips (3 on the left lobe, 2 on the right one in the specimen which I have examined); the median lobe is fine and slender and branches off into two, on a level with the anterior margin of the lateral lobes; it is ciliated (in the specimen I have examined the ciliæ were not spread and thus scarcely visible).

The mandibles (Pl. 3, fig. 6). Chela short and stout, the jaws of equal width; the upper one slightly longer and provided with 5 teeth at regular intervals; the terminal one is placed a little more inwards than the next one and both thus form a groove to receive the terminal tooth of the lower jaw; the 3rd and 5th teeth are

small; behind the 5th one a low, rounded tubercle; the sense hair on a level with the 3rd teeth. The lower jaw with 4 teeth, the 2nd and 4th of which are very small; the 3rd is strong, situated in the middle and directed backwards; close behind the 3rd is the 4th; the flagellum is long and provided with numerous hairs. The maxillary palps are very long and slender; the first joint with a low, rounded tubercle, on the internal side, near the base and provided with long hairs very close together, ventrally in the middle; the second joint with one straight bristle, subventrally and distally on the inner side; the 3rd joint with two short bristles in a transverse row interiorly and distally; one (the upper one) is shorter and chisel-shaped, the other widens distally to an oblique knife-shaped edge; 5th joint provided at the top, beside the usual bundle, with a hair of remarkable length. The maxillæ. (Pl. 2, fig. 24.) The maxillary lobes situated close together near the middle; they are perfectly straight and attached with an oblique, very broad base, as broad as or even broader than their own median edge; the lateral, thickened edge is turned sharply upward in the median half, so that it appears to be a separate narrow plate attached to it. The maxillary plates are narrow, lanceolate and hyalin slips, with smooth median and finely fringed lateral edges.

The styli are of a peculiar shape; they are pin-shaped, straight and exactly as long as the maxillary lobes, but on their dorsal side near the base they have a fine hyalin, slightly S-curved appendage. There are 5 pairs of hypostomatic hairs instead of the usual 4; one is placed far backward, two in a transverse row not far behind the articulation of the palps; of these the median pair is 3 times as long as the other; one very small, hyalin hair is inserted behind the articulation of the palps, externally. The terminal pair is long and pointed and placed on a line with the middle of the base of the maxillary lobes.

The legs. Legs I of the typical shape, tarsi II provided with 8 large stout thorns at the top, tarsi III with 3—4; tarsi IV with 2 similar thorns; basifemur IV ventrally with a short tubercle.

Kilimandjaro: 1 female.

Pachylaelaps BERL.

Pachylaelaps (Pachylaelaps) castanens n. sp.

(Pl. 2, figs. 29 & 32. Pl. 3, figs. 3, 20, 26 & 27.)

Male. Length 1,26 mm. Width 1,06 mm.

Colour deep chestnut-brown.

Texture. Sternal and ventri-anal shields scaly.

The dorsal side is covered by a single shield, which leaves unprotected a narrow, marginal strip of soft, white skin in the posterior half. The dorsal shield; the lateral edges of the anterior half and the front end strongly chitinous and curved downwards so as to become visible even on ventral view. The shoulders very broad, the sides falling off abruptly towards the front end, which is provided with a pair of short, stout bristles; the hairs small, scattered.

Ventral side (Pl. 3, fig. 3).

The tritosternum; the trunk not quite three times as long as it is broad; the proximal half with parallel sides, slightly narrowing distally; the feathered slips fused with their proximal $\frac{1}{6}$, attaining three times the length of the trunk. All the shields are fused together to one shield, anteriorly fused with the dorsal shield; the ventral shield long and triangular, with the top backward; the lateral edges slightly wavy. The sternal portion narrows gradually backwards and is very narrow between coxæ IV¹, owing to the great width of the foveolæ pedales IV. The usual four pairs of hairs present, in their usual places.

Ventri-anal portion with 4 pairs of hairs, placed in two rows, converging backwards; one pair behind coxæ IV, two in the middle of the shield, and one pair at the side of the oval aperture. Anal aperture oval, close to the posterior end. Stigmata in the usual places, rather large; the peritremata run forward to the anterior margin of foveolæ pedales I, nearly becoming dorsal.

Epistoma rather broad, triangular, with slightly convex edges, divided into fine, slender teeth arranged in two groups of 6—7 each with a smooth interval between them; as a part of the left side of the top is broken off in the single specimen I have examined I am not certain of its structure; on the right side however one notices a lateral, pointed lobe, the external edge of which is divided into 6 teeth, and which is divided in 3 teeth at the top; on the left (median) side there is an excavation. The mandibles (Pl. 3, fig. 27); the lower jaw is broader than the upper one and of equal width throughout to the articulation of the calcar. Terminal tooth not strongly curved, slender; one strong, backwardly directed tooth in front of the middle; calcar mandibuli slightly S-curved, tapering gradually towards the top, with a small ventral tubercle near the top; exactly as long as the distance from its base to the base of the joint. Upper jaw with two teeth opposite to those of the lower jaw.

The maxillæ. (Pl. 2, fig. 29.) The maxillary lobes long, slender, with narrow base and long straight, slender horns, curved inwards only at the base. There is a pair of long, narrow hyalin membranes, to all appearance attached to the inner (median) side of the demarcation line of the lobes; the membranes are curved slightly inwards at the top. These membranes resemble very much those which OUDEMANS has described in *Pachylaelaps ensifer* OUDMS². The maxillary plates are very thin, lanceolate, finely fringed, fused with their proximal $\frac{1}{3}$. Lingula very long, twice as long as the maxillary lobes and hairy.

The palps are long and slender, the joints decreasing in length towards the top; without any appendages; first joint dorsally bare and as usual, ventrally with two long hairs; second joint on the inner side, proximally, provided with one poniard-shaped bristle; 3rd joint with 2 bristles in a transverse row on the inner side in the

¹ In this respect the present species resembles *Platylaelaps (Pachylaelaps) latus* BERL. from Java, of which however only the female is known.

² A. C. OUDEMANS. Notes on Acari. Serie XI. Tijdschr. v. Entomologie. Br. XLVI. 1904. p. 110. Pl. 11, fig. 14.

middle; 4th joint ventrally and distally with one long hair; 5th joint of the usual shape.

Legs. All the legs richly provided with bristles. Legs I more slender than the others; coxa and trochanter of equal length; the anterior edge of the coxa externally with two short, hyalin thorns; femur interiorly with a row of 4 bristles, 3 of which are directed forward, while the posterior one points straight inward; exteriorly with 6 bristles two of which, one placed in the middle, the other distally, are much stronger; femur rather short, of equal length with the tibia; genu slightly shorter. The whole distal half of the tarsus exteriorly with short, pointed, hyalin hairs, arranged in 5 groups, the anterior one of which is the largest.

Legs II (Pl. 2, fig. 32) of the usual shape; coxa on the inner side, distally, with an extraordinary stout thorn; calcar femoralis very large and strongly chitinous, the posterior (ventral) side with a low, truncated tubercle near the base; the anterior edge sharp, with a longitudinal groove at the top and two low teeth; no processus axillaris, only a stout bristle on a low tubercle; processus genualis in the middle of the ventral edge of the genu, saddle-shaped; processus tibialis is a very large, thumb-shaped (on lateral view) projection at the inner side of the anterior edge of the tibia.

Legs III. Coxa on the dorsal side of the anterior edge with a conical, hyalin thorn; genu short, curved, with two dorsal tubercles, provided with two bristles each.

Legs IV (Pl. 3, fig. 20). Coxa long, ventrally, behind the middle, with one very short tubercle, its distal dorsal edge with a stout, pointed tubercle; femur with one sharp tubercle on the ventral side proximally.

Ambulacres. Owing to the caruncles not being spread out I am unable to describe their shape as well as that of the claws. The paratarsi I are comparatively longer than in *Pachylaelaps kibonotensis* TGDH, and present a very striking feature, being provided on the dorsal side in the middle with an oval, flat and button-shaped structure, excavated in the middle. (Pl. 3, fig. 26.)

Kilimandjaro, one male.

Paralaelaps nov. subgen.

The present species differs from the other species of the genus *Pachylaelaps* in some essential respects, as the shape of the ventral shield of the female, which is small, nearly circular and not contiguous to the anal shield, the small metapodial shields, and the absence of appendages on the 4th joint of the palps. But on the other hand the confirmity with regards to other characters is so apparent, that the differences in my opinion are only of subgeneric value.

Paralaelaps nov. subgen.

♀ Ventral shield small, rounded, widely separated from the anal shield. Ventri-anal portion of the ♂ sterniti-ventri-anal shield covers only the middle of the belly; 4th joint of palps without any appendages.

***Paralalaps kibonotensis* n. sp.**

(Pl. 2, figs. 26, 27, 30 & 31. Pl. 3, figs. 7, 9, 24 & 25.)

Male. Average length 1,17 mm. Greatest width 0,72.*Female.* 1,08 mm. » » » 0,6.*The male.*

Colour light brown. Texture smooth, the strips of weak skin surrounding the dorsal shield finely wrinkled. The shape is the for the genus typical one, with broad shoulders distinctly set off and from thence narrowing, with convex sides, towards the round posterior end.

The dorsal side is covered by one shield, which bears long, straight and pointed hairs, which are scarcely clothed with exceedingly minute hairs, and increase in length towards the shoulders and the front end, where there are resp. 4 and 3 pairs of long hairs; of the latter one pair, situated in the middle, is directed straight forward.

The strips of weak skin surrounding the dorsal shield bear numerous hairs, uniform with those of the shield.

Ventral side. (Pl. 2, fig. 30.)

Tritosternum. The trunk is not quite three times as long as it is broad and tapers slightly towards the anterior end. The slips coalesce with their basis and are $3\frac{1}{2}$ time as long as the trunk and very narrow, with thin fringes.

The sternal, metasternal, ventral, anal, endopal, metapodal, parapodal and peritrematic shields are fused together to a single shield, which covers the whole belly except for a strip of soft skin round along the margin, which widens considerably at the back of legs IV, so that the ventri-anal portion of the shield covers only a little more than the median half of the space behind legs IV. The sternal portion has numerous, transverse and backwardly curved lines, which give to it the appearance of being scaly. The anterior margin of it is thickened, ridge-like, concave and excavated in the middle, where the slightly projecting genital aperture is situated. There are 5 pairs of straight, pointed hairs on the sternal portion: one pair on both sides of and close to the genital-aperture; the other four are inserted on the very lateral thickened edges of the shield, one pair behind the middle of coxa II, one in front of the middle of coxa III, one in the angle between coxa III and IV and one near the hind margin of coxa IV. The ventri-anal portion of the shield is triangular, with wavy, anteriorly concave sides and a median posterior projection. It bears about 15 pairs of hairs, chiefly inserted in the lateral and posterior parts of it; one smaller hair on each side of and one behind the anus. The anus is small, situated close to the posterior margin. The stigma is situated on a level with a line drawn between coxa III and IV and its diameter is only a little longer than the broad peritrema, which winds along close to the outer side of the foveolæ pedales as far forwards as a little beyond the shoulders. The peritrematic shields are very narrow, only half as broad as the peritremata, and only discernible on the exterior side of the peritremata and at the back of the stigma.

The epistoma (Pl. 3, fig. 25 a.) is comparatively shorter and broader than in

the other species of the genus. It is triangular, with slightly concave edges and square, truncated top. The edges are provided with fine sharp teeth, arranged in groups of two and three. The top is divided into 4—5 irregular lobes, each of which is divided again into 3—4 long narrow teeth.

The mandibles are stout (Pl. 3, fig. 24).

The chela is short and high, only a little longer than it is high at the basis, and with very broad condylus. The jaws are of nearly equal width.

The upper jaw is a little longer than the lower one, with slightly concave upper edge, curved strongly at the tip, and beside the terminal tooth provided with one sharp, backwardly directed tooth closely in front of the middle of the jaw; between the two teeth there is a low, blunt tubercle at the back of which the sense hair is inserted. The lower jaw with two sharp, backwardly directed teeth opposite to those of the upper jaw; the anterior edge of the posterior one is raised as to act against the tubercle of the upper jaw. Calcar mandibuli very long, attaining more than the double length of the chela, slightly S-curved and perpendicular. It tapers towards the tip and seems to be excavated on the inner side; the groove continues along the inner side of the jaw close to its dorsal margin as far as to the condylus and seems here to indicate, where the calcar is fused with the jaw. The calcar is supported at its basis by the ventral edge of the jaw projecting as a high ridge with rounded front end. It has on the outer side, close to the margin of the ridge, a small tubercle.

The hypostoma (Pl. 2, fig. 31).

Between the coxæ of the maxillary palps there is a longitudinal groove. In this we observe 7 transverse, forwardly curved rows of very minute, tooth-shaped appendages. In front of the first row the inner (median) edges of the coxæ are free, slightly convex and with the anterior angles projecting. Of the four usual pairs of hypostomatic hairs, three, which are long and pointed, are inserted close together far forward, two in a transverse row on a level with the base of the palps and one near the median margin of the base of the maxillary lobes. The posterior pair is inserted nearly in the centre. The maxillary lobes (Pl. 2, fig. 31) are of a peculiar shape in so far as that they are provided with a thin appendage at the median side of the basis. The lobes themselves are of the typical, well-known horn-shape and strongly chitinous; they are long, narrow and curved and project beyond the first free joint of the palps with $\frac{1}{3}$ of their length. The appendages arise from the basal part of the median edge of the lobes and from along the ventral side of their basis, exactly where the articulation is. They attain exactly the length of the lobes; the proximal half is of even width throughout and its median edge is thickened, curved downwards as to become nearly vertical, and set off from the rest by a small incision. In front of this the appendage narrows like a neck and widens again to a thin, hyalin and fin-shaped blade. This very remarkable structure resembles to a certain extent the structure which I have recently described in two genera of myriopodophilous An-

tennophorinae¹, but cannot answer to the same purpose as in those forms i. e. »to act, together with the thin plates along the edges of the maxillary plates, as a sheet to the mandibles with their fringes and collect as in a pipe the liquid which the mandibles have absorbed with their brushes» (l. c. p. 25). Because in the present species it is a secondary sexual character which occurs only in the male. The maxillary plates are narrow, lanceolate and finely fringed slips, fused with their proximal half.

The legs are long and well depeloved, with distinctly demarcated basifemora and basitarsi. Legs I more slender than the others, with smaller claws and caruncles. Coxa and trochanter of the same length; the former flat and curved, with two hairs ventrally and one very short, stout thorn on the dorsal side, at the interior anterior margin. The trochanter ventrally with two hairs, one of which is perpendicular while the other is directed forward; dorsally with one, interiorly one, and externally one hair. Basifemur short, neckshaped. Femur (without basifemur), genu and tibia of nearly equal length, provided with numerous, long, straight and pointed hairs. Tarsus provided with a dense bundle of hairs at the top on the dorsal side.

Legs II (Pl. 2, fig. 27.) very large and powerful; femur with long, stout calcar femoralis, the posterior edge of which is even while the anterior edge is provided with three short teeth, increasing in size backwards. No processus axillaris, only a sharp bristle inserted on a small tubercle; processus genualis and tibialis low and thick, of the same hatchet-shape and with the margin excavated in the middle, but the processus genualis is a little larger; both are half as long as the ventral edge of the resp. joints. One perpendicular hair is situated near the hind margin at the exterior side of processus genualis, another immediately at the back of processus tibialis. Legs III and IV. All the joints of legs IV are more elongate than in legs III, especially the trochanter and the tarsus.

The ambulacres with comparatively small claws and large empodium.

The female.

The shape is the for the genus typical one. Colour, texture and dorsal shield like that of the male.

Ventral side (Pl. 3, fig. 9).

Tritosternum shaped like that of the male. Sternal, endopodal and metapodal shields fused together. Sternal shield with concave anterior margin, extends backwards as far as to the anterior margin of coxae IV, with deeply excavated posterior margin.

The usual 4 pairs of hairs present, long straight and pointed. They are placed as follows: one on the anterior edge, as far from the antero-lateral angles as from the middle, one near the posterior side of coxa II, one near the anterior side of coxa III and the 4th in the corner between coxa III and IV.

Genital shield fused with the ventral shield, small, rounded; the portion at the back of coxa IV nearly circular and its diameter only slightly longer than the distance to the anal shield. No hairs in the middle, only two pairs of long, lateral

¹ I. TRÄGÅRDH. Description of two myriopodophilous genera of Antennophorinae. Arkiv f. Zoologi. Bd. 3. No. 28 1907.

hairs, shaped as those of the sternal shield, one situated at a level with the hind margin of coxa IV, the other half way between the first and the hind margin of the shield. The large portion of soft cuticle surrounding the geniti-ventral and anal shields is densely clothed with long, straight pointed hairs. The anal shield rather large, anteriorly broad and rounded, posteriorly narrowing and situated as far from the hind margin of the body as its own length. It is provided with the usual 3 small hairs. Metapodial shields small, ring-shaped, projecting only slightly backwards and fused with the peritrematic shields which extend forwards as far as to the front margin of the foveola pedalis I. Stigmata as in the male.

Epistoma (Pl. 3, fig. 25, b); the sides are a little more concave than in the male. The tip is divided in 5 lobes of which the median one is simple and only bifurcate at the very top; the other two pairs are each divided into two, of the size of the median lobe; those of the exterior pair are simple, those of the interior pair are bifurcate at the top like the median lobe. The mandibles (Pl. 3, fig. 7). The chela more slender than in the male. The lower jaw slightly shorter than the upper one, with sharp terminal tooth and in the distal third two sharp teeth of which the posterior one is the larger. The upper jaw with one subterminal tooth close behind and a little on the outer side of the terminal one so as to form a deep groove into which the terminal tooth of the lower jaw fits. Behind the subterminal tooth a low tubercle, then the sense hair, then a large, backwardly directed tooth, then an excavation and an high blade rounded anteriorly.

Hypostoma (Pl. 2, fig. 26). Closely in front of the anterior, transverse row, described above in the male, one notices a fine, straight and transverse line, in front of which are two small, narrow, anteriorly rounded plates along the median margin of the coxa. The maxillary lobes are shorter and stouter than in the male, with broader basis and shorter horns. The appendages are much shorter than in the male and of entirely different shape, being lanceolate and attached on both sides of the articulation of the lobes, their median edges being to all appearance continuous with the median edges of the coxa. The maxillary plates are very thin and narrow slips, with fine fringes, and fused together with $\frac{1}{4}$ of their length; they extend forwards to the anterior margin of the third joint of the maxillary palps.

The hypostomatic hairs are placed nearly as in the male, only the anterior pair being inserted a little more backwards.

The legs. Legs I, III and IV like those of the male. Legs II larger than the others but without any tubercles.

Kilimandjaro: Kibonoto, 6. XI. 1905. On a great *Scarabaeus*, 5 ♂♂, 8 ♀♀, one nymph.

*Subfam. Laelaptinae.***Laelaps C. L. KOCH.****Laelaps (Laelaps) muricola n. sp.**

(Pl. 2, figs. 17 & 22. Pl. 3, figs. 1, 4, 12, 13 & 31.)

Male. Average length 1,04 mm. Greatest width 0,69.*Female.* (with 1 large egg). Average length 1,4 mm. Greatest width 0,98 mm.*The male.*

The colour is pale yellow. The general shape and the dorsal shield like that of *Laelaps agilis* C. L. KOCH [compare BERLESE, Mesostigmata, tab. 50].

Texture scaly; the weak parts of the cuticle finely wrinkled.

Ventral side. (Pl. 3, fig. 4.)

Tritosternum of the usual shape. Sternal, metasternal, endopodal, ventral and anal shields fused to one shield which exhibits a scaly texture. Genital aperture broad oval, projecting slightly beyond the anterior edge of the sternal shield. No demarcation visible between the sternal and the endopodal shields.

There are 5 pairs of long, sharply pointed bristles on the sterno-metasternal portion, placed as follows: one pair at the front edge half way between the genital aperture and the antero-lateral corners; one marginal pair on a line with the middle of coxæ II; one pair in the corner between coxæ II and III, one pair in the corner between coxæ III and IV and one pair on a line with the posterior margin of coxæ IV.

Ventri-anal portion large and triangular; the antero-lateral corners are rounded and extend beyond coxæ IV; the lateral sides are wavy and slightly excavated on a level with the anal aperture.

On the ventral portion there are no small hairs, only 5 pairs of bristles arranged as fig. 4. shows; round the anal aperture the usual 3 hairs, of which the terminal one is long and straight.

No inguinal shields.

On the soft portion between the ventri-anal shield and the margin of the body there are about 25 pairs of somewhat smaller bristles.

Stigmata on a line between coxæ III and IV, the peritremata extend forward only to the middle of coxæ II but they are continued by chitinous ridges which run beyond the coxæ I and coalesce with the anterior margin of the dorsal shield above the rostrum. The peritrematic shields are, although weak and narrow, distinctly discernible on the external side of the peritremata.

The epistoma is broad and rather short, nearly semicircular, with the edge divided into fine lobes or fringes, which increase in length towards the top. The mandibles (Pl. 3, fig. 13.). Near the base of the chela, on the dorsal side, there

is a short finger-shaped appendage; on the ventral side in front of the pulvillum we notice a transparent, rounded blade.

The chela. The upper jaw is short, stylet-shaped and attains only $\frac{1}{3}$ of the length of the lower one. It bears on the inner edge, near the base, a small, transparent pin (this is not delineated in the figure).

The lower jaw is also stylet-shaped, but comparatively narrower than the upper one. The calcar mandibuli is very long, with flat ventral rounded dorsal side and blunt edges; its distal third is bent downward and backward in an even curve, widens slightly at the tip, becomes laterally flat and terminates with a sharp edge, provided with a pair of exceedingly minute hairs.

The hypostoma (Pl. 2, fig. 17) is shaped very much like that of *Laelaps* (*Laelaps*) *Versteegii* OUDMS¹.

The maxillary lobes are rather large, triangular, soft and transparent, with broad base and placed almost perpendicularly; thus surrounding both the lateral and the ventral side of the inner mouthparts.

The maxillary plates are transparent, finely fringed slips, and are very difficult to discern owing to their laying flat on the ventral side of the stout, rather blunt and tongue-shaped lingua, which extends forward beyond the anterior margin of the second joint of the palps. The ventral side of the lingua is densely clothed with minute, perpendicular or backwardly directed hairs.

The maxillary palps are 5-jointed, slender; 1st and 4th joint of equal length, slightly longer than the 2nd and 3rd which are also of equal length. First joint flat, with high ventral edge, provided with 2 hairs, dorsally bare; 2nd joint dorsally with 3, ventrally one external and one internal hair; 3rd joint dorsally with 2, externally with 1, internally with two hairs of which the anterior one is flat and club-shaped. The 4th joint with about 10 hairs. The terminal joint short, cylindrical, on the inner side, proximally, provided with the usual, fork-shaped bristle, at the top with a dense bundle of 6—8 sharply pointed hairs.

The legs short, the 1st and 2nd pair thick, the hind legs slender.

Coxa I ventrally with two long, stout and pointed bristles, one of which is placed near the posterior margin on a transversal chitinous ridge, the other more outward. Coxa II with two similar bristles at the distal end, one anteriorly, the other posteriorly. Coxa III also with two bristles placed as is coxa II, but the posterior one of which is much shorter and stouter. Coxa IV with one fine hair in the middle near the distal margin. The other joints are richly provided with bristles placed chiefly in two dorsal, one external, one internal and two subventral rows. The following are noteworthy: on the back of femur I and situated near the anterior margin, on a low tubercle, there is a long bristle directed obliquely backward; genu I with a similar one close to the posterior margin. The bristles of the exterior dorsal row of

¹ A. C. OUDEMANS. *Laelaps Versteegii*, a new species of parasitic mites, in Notes from the Leyden Mus. vol. XXIV, p. 223—231.

tibia I are short, perpendicular or even directed backward. Tarsus I dorsally, behind the middle, with one fine, long and perpendicular hair.

The other hairs of tarsus I also fine and slender. At the top, dorsally, there is a dense bundle of fine, more or less adpressed hairs, two pairs of which are longer and inserted on low tubercles; surrounded and protected by the hairs there is a small area provided with short, conical and apparently very thin-walled pins. Femur II provided dorsally and distally with a bristle similar to that of femur I but shorter, ventrally and proximally with another, directed backward. Tarsus II provided with numerous, very stout bristles.

Claws strong, those of the 1st pair of legs shorter than the others. As the ambulaeres of the specimens I have examined are not spread out, I am unable to describe the shape of the caruncles.

Female.

Colour much more dark brown than in the male. Texture of the dorsal shield scaly.

Dorsal shield (Pl. 3, fig. 12). The curved lines flanking the pores of the hairs are more distinctly discernible than the others. The cuticle of the anterior part of the shield is extremely finely punctured by pin-prick like markings. There are several thin, oval or rounded areas penetrated by numerous pores. Two pairs are placed near the posterior margin in the middle. Four pairs, two and two more close together, are to be found near the sides, somewhat behind the middle, and several small and less distinct ones further forward.

The dorsal shield itself exhibits in the anterior half several symmetrically arranged dark-coloured thickenings of the inner surface of the cuticle, which produce a very characteristic pattern. From the anterior, thickened edge, half-way between the top and the shoulders above the first pair of legs two broad ridges run backward converging until they coalesce by a broad and short transverse ridge, thus surrounding an median oval, thin and light-coloured area; from the junction they run straight backwards until they coalesce again for a considerable distance, thus forming an second median, narrow oval, light-coloured area, behind which they unite and project into a median point which vanishes backwards. Behind the first junction and on a level with the second one they branch off into two lateral transversal ridges which widen and vanish distally.

The ventral side (Pl. 3, fig. 1).

Tritosternum. The trunk short, the lateral edges strongly chitinous and thickened on the dorsal side; the slips coalesce with their proximal $\frac{1}{4}$, which are nearly twice as long as the trunk.

The sternal shield very thick, dark-brown. The anterior edge square, with a narrow, soft and finely wrinkled portion in front of the first pairs of sternal bristles (jugular shield?); the antero-lateral angles are very long and strongly chitinous, the lateral edges are very thin blades; the shield extends backward to the middle of coxae III; the posterior margin is nearly straight in the middle, with a

pair of excavations near the postero-lateral angles. Metasternal shields small, triangular, situated in the corners between coxæ III and IV and provided with one pair of long bristles. Genital and ventral shields fused together to one shield, which extends backward beyond the middle of the belly and widens considerably, behind coxæ IV, towards the posterior $\frac{1}{4}$ of its length; from thence it falls off towards the posterior margin which is deeply concave in the middle; 4 pairs of marginal bristles. Anal shield large, triangular, with rounded angles and sides, separated from the geniti-ventral shield by a streak of soft skin, as broad as the length of the anal aperture; with the usual three hairs, two of which are placed just behind the anal aperture while the third, terminal one is a straight bristle. Anal aperture oval, in the centre of the shield. Inguinal shields small, rounded and finely punctured, placed outside and behind coxæ IV. Stigmata in the usual place. Peritrematic shields present, although very narrow; they form a small plate behind the stigmata, and are at first very narrow, but widen on the external side of coxæ II, and extend forward as far as to the anterior shoulders, above legs I.

The epistoma is shaped like that of the male, but a little longer.

The mandibles (Pl. 2, fig. 31); the chela rather narrow and slender; the lower jaw nearly twice as broad as the upper one and slightly longer, with long, strongly curved terminal tooth, the inner (posterior) side of which is excavated; besides there are two small, sharp and somewhat backwardly directed teeth in the distal third, one close behind the other; the upper jaw with short terminal tooth, the posterior edge of which is provided with a small tooth; the sense hair is comparatively large and placed on a level with the third small tooth; further backward, behind the middle, there is a blunt tooth, at the back of which the edge is raised.

The hypostoma (Pl. 2, fig. 22) resembles much that of the male, but the maxillary plates are divided into 2 pairs of transparent slips, the external ones of which are rounded, with no fringes; the median ones shorter, pointed and finely fringed. The maxillary palps shaped like those of the male.

Legs shaped like those of the male, but larger in proportion, with stouter bristles. Coxa I, anterior bristle short, very stout, the posterior one twice as long, directed backward; femur I like that of the male; genu the same, but with one longer, poniard-shaped bristle on the dorsal side, proximally; all the bristles on the dorsal side of genu and tibia perpendicular.

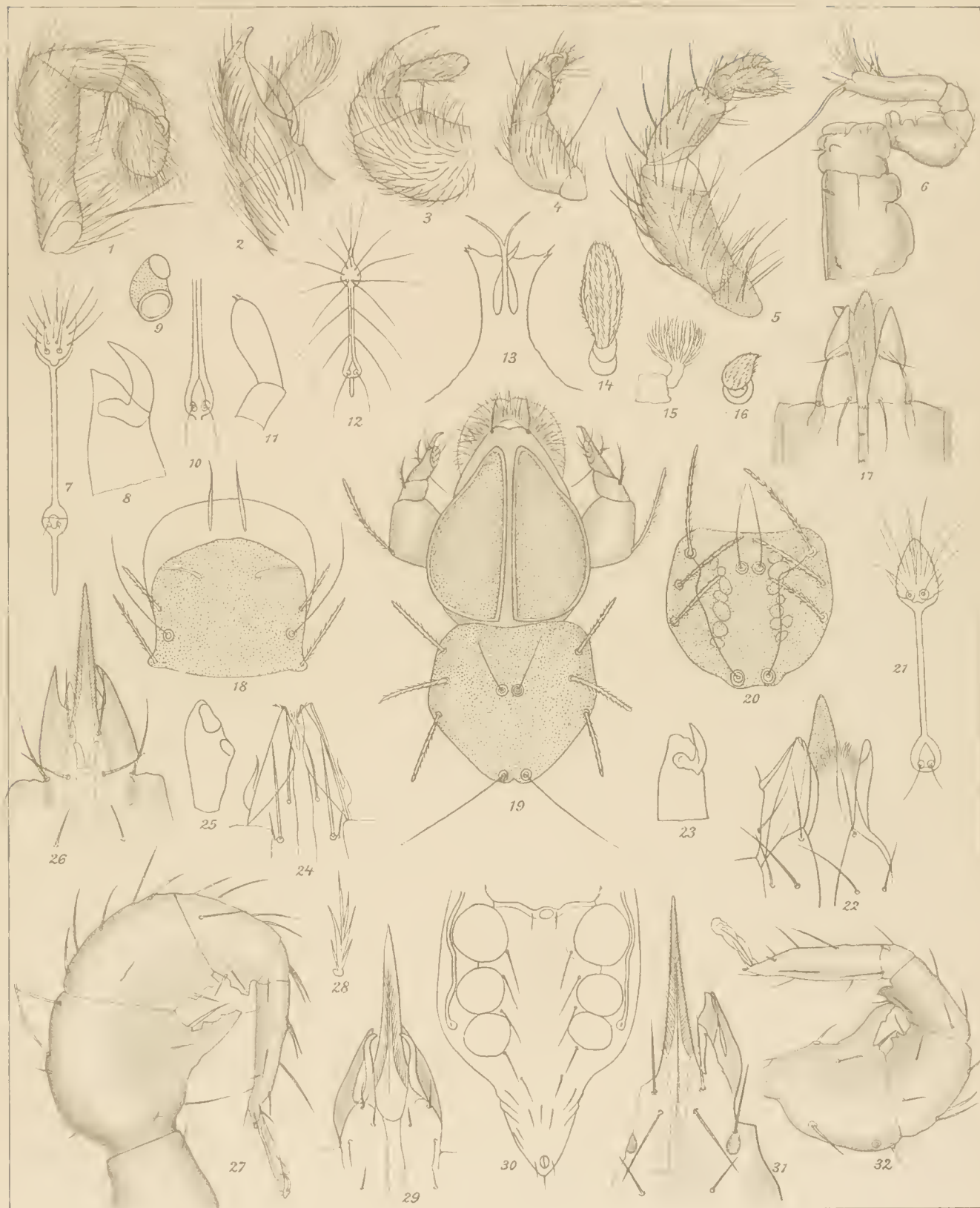
On *Mus Hildebrandti* PETERS.

Kilimandjaro, Kibonoto 3. VII. 1905, 4 females; 4. VII. 5 males, 10 females.

TAFEL 2.

Tafel 2.

- Fig. 1. *Rhyncholophus sicutiformis* TGM. Palp. $\times 75$.
 » 2. *Trombidium simile* n. sp. Palp *150.
 » 3. » *tinctorium* (L.) » *75.
 » 4. *Rhyncholophus meruensis* n. sp. » *75.
 » 5. *Erythræus mucronatus* n. sp. » *75.
 » 6. *Uropoda plana* n. sp. Deutonympha 1st leg. *150.
 » 7. *Erythræus Dugèsi* Nic. Crista metopica. *75.
 » 8. *Trombidium simile* n. sp. Top of mandible *150.
 » 9. » » Eyes *150.
 » 10. » » Crista metopica *75.
 » 11. » » Tibia and tarsus I. *30.
 » 12. *Erythræus mucronatus* n. sp. Crista metopica *30.
 » 13. *Holostaspis marginedentatus* n. sp. Epistoma *310.
 » 14. *Trombidium simile* n. sp. Hair *812.
 » 15. » » » *620.
 » 16. » » » *620.
 » 17. *Laelaps (Laelaps) muricola* n. sp. ♂ Hypostoma *150.
 » 18. *Trombidium meruense* n. sp. larva Anterior dorsal shield *150.
 » 19. *Erythræus kibonotensis* n. sp. Rostrum and shield *150.
 » 20. » *areolatus* n. sp. Dorsal shield *150.
 » 21. *Rhyncholophus meruensis* n. sp. Crista metopica. *75.
 » 22. *Laelaps (Laelaps) muricola* n. sp. ♀ Hypostoma. *150.
 » 23. *Trombidium tinctorium* (L.) Top of mandible. *150.
 » 24. *Holostaspis (Holostaspis) marginedentatus* n. sp. Hypostoma. *150.
 » 25. *Trombidium tinctorium* (L.) Eyes *150.
 » 26. *Pachylaelaps (Paralaelaps) kibonotensis* n. sp. ♀ Hypostoma *150.
 » 27. » » » ♂ Leg II *75.
 » 28. *Rhyncholophus meruensis* n. sp. Hair from dorsal side. *620.
 » 29. *Pachylaelaps (Pachylaelaps) castaneus* n. sp. ♂ Hypostoma *150.
 » 30. *Pachylaelaps (Paralaelaps) kibonotensis* n. sp. ♂ Ventral shield *43.
 » 31. » » » ♂ Hypostoma *150.
 » 32. » *(Pachylaelaps) castaneus* n. sp. ♂ Leg II *75.
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TAFEL 3.

Tafel 3.

- Fig. 1. *Laelaps (Laelaps) muricola* n. sp. ♀ Ventral view $\times 30$.
 » 2. *Holostaspis (Holostaspis) marginedentatus* n. sp. ♀ Ventral view *30.
 » 3. *Pachylaelaps (Pachylaelaps) castaneus* n. sp. ♂ Ventral view *30.
 » 4. *Laelaps (Laelaps) muricola* n. sp. ♂ Ventral view *43.
 » 5. *Urodinychus testudo* n. sp. Tritosternum *812.
 » 6. *Holostaspis (Holostaspis) marginedentatus* n. sp. ♀ Mandible *150.
 » 7. *Pachylaelaps (Paraelaelaps) kibonotensis* n. sp. ♀ » *150.
 » 8. *Uropoda plana* n. sp. Tritosternum, *310.
 » 9. *Pachylaelaps (Paraelaelaps) kibonotensis* n. sp. ♂ Ventral view *43.
 » 10. *Urodinychus testudo* n. sp. Epistoma. *407.
 » 11. *Uropoda plana* n. sp. Ventral view. *60.
 » 12. *Laelaps (Laelaps) muricola* n. sp. ♀ Dorsal shield. *30.
 » 13. » » » » ♂ Mandible. *150.
 » 14. *Uropoda plana* n. sp. Tectum *150.
 » 15. » » Jugular shield *310.
 » 16. » » Vertex and anterior part of dorsal shield *106.
 » 17. *Urodinychus testudo* n. sp. Trochanter I. *406.
 » 18. » » Jugular shield. *811.
 » 19. » » Dorsal view. *107.
 » 20. *Pachylaelaps castaneus* n. sp. ♂ Caxa and Trochanter IV. *60.
 » 21. *Uropoda plana* n. sp. Dorsal view. *30.
 » 22. » » Maxillary palp. *150.
 » 23. *Urodinychus testudo* n. sp. Ventral view. *107.
 » 24. *Pachylaelaps (Paraelaelaps) kibonotensis* n. sp. ♂ Mandible. *150.
 » 25a. » » » ♂ Epistoma. *310.
 » 25b. » » » ♀ » *310.
 » 26. » *castaneus* n. sp. ♂ Paratarsus I. *310.
 » 27. » » » Mandible *150.
 » 28. *Uropoda plana* n. sp. The edge of the dorsal shield. *310.
 » 29. *Urodinychus testudo* n. sp. Hypostoma and maxillary palp., side view *406.
 » 30. » » Mandible. *812.
 » 31. *Laelaps (Laelaps) muricola* n. sp. ♀ Mandible *150.

